III. Some Thoughts on Feasibility Studies

By Hans A. Adler*

Sychrava's recent article in this Journal[1] emphasises the many difficulties in appraising transport projects. From his experience in Thailand, he concludes that in practice it is very difficult to appraise road projects "to a standard of correctness which is intellectually tolerable".

Anyone with similar experience in developing countries will sympathise with this view. There is never enough reliable information about the past and present, forecasting is difficult, transport is only one of many factors, the reaction of farmers to a new road is uncertain, shadow prices may be only informed guesses, etc. Nevertheless, the views expressed in the article could lend themselves to a number of important misunderstandings. First, some of the generalisations are based on a special type of feasibility study; from a wider perspective they seem less valid. Second, the article makes some incomplete and therefore misleading statements about the views of the World Bank. And third, the importance given to secondary benefits seems greatly exaggerated.

SPECIAL NATURE OF THAILAND STUDY

The Thailand study involved the identification of suitable feeder roads and an assessment of their priorities. It required the review of 124 road projects (totalling 2,525 kms), of which 62 roads (totalling 1,288 kms) were selected and ranked in order of priority. The study thus dealt with a large number of road projects.

The appraisal of the economic aspects of these 124 roads was done in one year by one expatriate economist, assisted by 4 Thai economists and 5 agriculturists. This means that the expatriate had only about 2½ working days per road. If teams were established consisting each of one economist and one agriculturist, each team was on the average responsible for about 25 roads and had about 10 to 12 working days per road. With proper allowance for report writing, travelling, etc., the actual time available was even less. Thus some of the author's problems may have arisen from the short time available for a proper appraisal. It is possible that, while the Thai study presented a reasonable programme of feeder roads, detailed appraisals of specific roads may still be necessary.

A second consideration is that the study dealt exclusively with feeder roads. In most countries feeder roads account for only a small proportion of total road investment; the initial construction is usually locally planned and executed, with a minimum amount of equipment. At the same time, the economic appraisal of feeder roads tends to be particularly difficult, primarily because expanded agricultural production generally requires not merely roads but also other inputs, such as

*The views expressed in this note do not necessarily represent those of the Harvard University Development Advisory Service, or of the World Bank, where I previously served as Chief Transport Economist.

[1]Sychrava, L. "Some Thoughts on Feasibility Studies". *Journal of Transport Economics and Policy*, Vol. II, No. 3, September 1968, pages 332–348.

fertiliser, extension services and land reforms. There is thus, in general, no direct relation between transport and agricultural development. The proper appraisal of feeder roads therefore frequently requires a broad agricultural investigation, of which roads may be only a small part.

For appraisal purposes, feeder roads might be divided into three major types. In the first, the transport facility is an integral part of an agricultural, industrial or mining project; in such a case, the evaluation must focus on the entire project and on providing the least-cost transport solution. The second type occurs where transport is the only significant bottleneck to development and where all other requirements are already met. An example would be a road to connect an existing town and a nearby fruit-growing area, where the products are now being transported by animal or cart but where high transport costs alone prevent increased production. Finally, there is the frequent case where roads are built into a new area, which, though promising, will not develop unless other investments and improvements are also made. Transport investments in this last group are rarely justified unless accompanied by the other improvements.

Sychrava does not indicate how many of the feeder roads fell into each of these categories. He points out that in areas where "the basic scientific work had been done – agricultural and soil fertility studies, soil surveys and maps – one would make good progress". But "where such work had not been done, one could do very little, and it would not have made much difference if there had been twice as many agriculturists on the staff". This latter group of roads may not have been large, since induced benefits accounted for only 30 per cent of total benefits and "the savings in road user costs were the decisive element in the justification of most projects". Admittedly the appraisal of feeder roads without adequate agricultural information is more or less meaningless, but this conclusion is much less relevant for other road projects.

VIEWS OF WORLD BANK

The World Bank has taken no official position on the proper economic appraisal of road projects. It has, however, encouraged certain types of analyses. Several statements in the article about World Bank views are incomplete and therefore misleading.

Project Appraisal as a Self-Contained Operation

The article alleges that in the World Bank's approach "the appraisal of a project is a self-contained operation: macroeconomic processes and planning form the background of project appraisal, but do not enter into it. Thus we were not asked to determine the feeder road programme as part of a general transport study, or to construct a macroeconomic model".

The Bank's publications and practices recognise that project appraisal is not a self-contained operation. *World Bank Staff Occasional Paper No. 4*[2] states that "Before a specific transport project can be properly evaluated, two preliminary steps are highly desirable and usually essential . . . The first step consists of a general economic survey of the country". The second step "should be a detailed transportation survey

[2]Hans A. Adler, "Sector and Project Planning in Transportation", 1967, pp. 35–36.

of the country in order to determine the priorities within that sector". The *Occasional Paper* concludes that "unless both a general economic and a transportation survey precede the evaluation of a specific project, there is a considerable risk that the evaluation may be sufficiently incomplete as to lead to a misallocation of resources". In line with this view, transportation surveys have been made under World Bank auspices in Argentina, Bolivia, Brazil, Colombia, Equador, India, Korea, Malaysia, Nepal, Taiwan and many other countries.

Appropriate Discount Rate

The article states that for the purpose of ranking projects "The World Bank prefers the internal rate of return method".

In its own appraisal reports the Bank has been using the internal rate of return for a number of reasons. First, it has not been practicable to estimate an appropriate discount rate for each of the approximately eighty developing countries which are members of the Bank. Second, the Bank must assure itself only that the project is justified, but it need not be the highest priority project in the country. The Bank's use of the internal rate is thus *not* for the purpose of ranking projects, but only as a short-hand measure to be compared with a minimum acceptable return. Third, Bank officials probably have a better understanding of the meaning of an interest rate than of the meaning of a net present worth or a benefit-cost ratio.

However, the *Occasional Paper* recognises that "preparation of a development plan and the concomitant determination of relative priorities does require discounting by an opportunity cost of capital, so that this is the better method for countries planning their investments" (page 60). In line with this, studies of sector plans and priorities made under World Bank auspices generally use a discount rate, though internal rates of return might also be shown.

As to the choice of discount rate, the article states that "The World Bank, which was to provide loan finance at 6½ per cent for some of the recommended projects, would have looked with disfavour at a rate of less than 10 per cent". This lends itself to possible misunderstanding because there is no relationship between the Bank's interest rate, which is the same for all countries, and the proper discount rate in a particular country. Moreover, since the article states that a rate of 12 per cent should have been used, the Bank's position seems well justified.

Benefits from Induced Traffic

The article suggests that the Bank has an ambiguous attitude toward measuring the benefits from induced traffic. It states that, while the Bank "appears to acknowledge" the limitations of consumers' surplus as a yardstick of induced benefits, it is not prepared to discard the concept, and its advice "that both consumers' surplus and induced net output should be counted as project benefits is not easy to interpret, for consumers' surplus and net induced output are alternative rather than complementary ways of measuring the same effect". The article concludes that it is virtually impossible to measure the net output with tolerable accuracy.

The *Occasional Paper* states that where a transport facility leads to increased output "the net value of this additional output is the proper measure of the economic benefit", and it goes on to point out that "the net value of output and the vehicle operating savings for generated traffic are, of course, not additive" (page 55). (The

term "vehicle operating savings for generated traffic" used here is the same as "consumer surplus on generated traffic" used in the article.) There exists, however, a practical problem, since it is usually easier to calculate vehicle operating savings than net output. Where the expected generated traffic is a small part of the total traffic, the likely error from using vehicle operating savings is relatively small. But, as the *Occasional Paper* points out, "To the extent that the main purpose of a new transport facility is to open up new lands for cultivation or to otherwise make possible new economic development, reductions in transport costs for generated traffic are not a useful measure of the economic benefits of the project. In this situation, the benefit consists of the new production made possible". The induced benefits in the Thai studies, measured by the increase in net output, constituted on the average 30 per cent of total benefits. It would be interesting to learn whether the measurement of benefits based on vehicle operating savings would have led to different results.[3]

As for the difficulties of measuring net output, the degree of complexity is closely related to the three types of developmental roads discussed above. Where feeder roads are part of an agricultural project or are the only bottleneck to development, the problems do not seem unusually difficult; but where roads are intended to open up new land without being accompanied by a programme for other investments, the measurement of benefits is usually an almost impossible exercise.

SECONDARY BENEFITS

The article puts major emphasis on the importance of secondary benefits. Even if this was appropriate in Thailand, it seems much less relevant for other transport projects, or even for feeder roads, in other countries.

Multiplier and Accelerator Effects

The article suggests that, because of serious rural underemployment, the multiplier and accelerator effects of the investment-induced purchasing power should be included as additional benefits.

The multiplier and accelerator are useful concepts in measuring the impact of additional purchasing power where there is excess productive capacity which is idle for lack of demand. They have thus been important tools in the analysis of the depression of the 1930's, for example. The problems of the developing countries, however, are usually quite different. They have insufficient productive capacity, including both capital and skilled labour, so that a mere increase in demand would generally lead not to increased output but to higher prices.[4]

---

[3]Sychrava has advised me that such a comparison was made in one or two cases. He concludes that "Since my forecasts of normal traffic took into account the retarding effect on development of the worsening condition of the unimproved road, I suspect that in the majority of cases the traffic method would have given smaller values, but that the difference would not have been all that large".

[4]There are, of course, instances of excess capacity in specific industries in developing countries. This is due sometimes to lack of raw materials, sometimes to lack of demand for the output of these industries. The response to such excess capacity lies in specific measures to meet the particular problems of the industry involved, not in such general measures as tax reduction or deficit finance to increase demand.

Gunnar Myrdal, in his review of the spread effects through changes in demand and supply, has found that "the general structure of South Asian economies suggests that the inhibitions and obstacles to the effective spread of growth-inducing impulses through increased demand are much more formidable there than in the West".[5] The stimuli for expansion are quickly checked by such bottlenecks as "deficiencies in the supply of technical and administrative personnel, inadequacies in the supply and mobility of skilled labour, bottlenecks in the availability of raw materials and semi-manufactured goods, and deficiencies in the transport and power systems". As a result, increases in demand cannot readily be met by increases in output. Myrdal concludes that "potential multiplier effects are often killed at the start of the process".

Moreover, even if the increase in demand should stimulate some additional output, the article produces no evidence that the stimulation from feeder roads is greater than that from steel mills, irrigation projects or other investments. Only such additional stimulation would be relevant in estimating the benefits of feeder roads.

Indirect Benefits

The article suggests that other indirect benefits may be even more important than those which could be quantified. In areas where the inhabitants have never seen a motor car, the road project is in effect "a social change project, and the thing to look at first is the upheaval in environment caused by the road". In fact, the article concludes, "there is something rather absurd in evaluating the effect of a road on such areas in terms of induced output".

There is some truth in this, though it is obviously limited to projects which make road transport available for the first time to a populated area. Myrdal, in his review of industrialisation in South Asia, also refers to claims that industrialisation will lead to "such institutional and attitudinal changes as the development of markets, the rationalisation of attitudes, the spread of skills and the spirit of enterprise, and increased mobility". He finds, however, that "on the whole the mechanism through which the initiation of an industrialisation programme will produce these desirable consequences is left foggy and unexplained", that "the extent to which spread effects along these lines can be transmitted is, in fact, a function of the cultural, social and economic levels already obtained" and that they are not likely to be major in most South Asian countries.[6] Again, therefore, the Thai experience does not lend itself to ready generalisation even in the limited area of feeder roads. Nor is there any evidence that these indirect effects are greater for roads than for other investments.

The article suggests that there is a strong tendency – "common to all feasibility studies" – to underestimate benefits because "the benefits which are most difficult to quantify, and which may consequently be quantified on a conservative basis, or not at all, may well be the most important ones". This may have been the case in the Thai studies, but it must come as a surprise to those who have read a large number of feasibility studies. The more common tendency would seem to be the reverse: underestimates of direct costs and omission of external costs, high traffic forecasts for long periods, unduly short periods during which expansion in output will materialise,

[5] *Asian Drama*, New York, 1968, volume II, pp. 1184–92.
[6] *Ibid.*, pages 1185–6, 1196–9.

high values for time savings of passengers, double counting of benefits, etc. Nor does the evaluation of completed road projects support the claim of a general underestimate of benefits.[7] The reading of many feasibility studies leaves one with the clear impression that when a project is not justified indirect benefits suddenly become important. It is probably not unfair to conclude that indirect benefits are frequently the last refuge of doubtful projects.

CONCLUSION

The cost-benefit analysis of transport projects has been developed on a significant scale only since 1960 and is still in the process of being improved. It was never intended as a substitute for the exercise of judgment, but as an aid to the disciplined and systematic use of judgment. Sychrava finds that it cannot produce results "to a standard of correctness which is intellectually tolerable"; others might conclude that the failure to apply it is intellectually even less satisfactory.

Harvard University,
Pakistan Advisory Group

[7]For example, van der Tak and de Weille, *ibid.;* G. W. Wilson, B. R. Bergman, L. V. Hirsch and M. S. Klein, *The Impact of Highway Investments on Development*, The Brookings Institution, Washington D.C., 1966. There are important institutional reasons for optimism, such as the desire of government agencies to promote their projects; feasibility studies are frequently intended to prove that a project is justified, not to determine whether it is justified.